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Organisms, Diversity & Evolution 5 (2005) 85–88

ORGANISMS DIVERSITY & EVOLUTION

www.elsevier.de/ode

Fridericia larix sp. nov. (Enchytraeidae, Oligochaeta) from Irish soils

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Received 27 April 2004; accepted 5 June 2004

Abstract

A new species of *Fridericia* (Enchytraeidae, Oligochaeta) is described from soils in Ireland. It was found during sampling campaigns in the framework of a comprehensive taxonomic revision of the genus (Schmelz, 2003. Taxonomy of *Fridericia* (Oligochaeta, Enchytraeidae). Revision of species with morphological and biochemical methods. Abh. Naturw. Ver. Hamburg, N.F. 38, 1–415, figs. 1–73), but it was not included in that study. *Fridericia larix* sp. nov., named in reference to the type locality, belongs to the large and taxonomically difficult group of species with two diverticula per spermatheca. It is distinguished from all known congeners by the following combination of characters: (1) a maximum of four chaetae in ventral preclitellar bundles; (2) oesophageal appendages poorly branched; (3) no pharyngeal glands in segment VII; (4) coelomocytes without refractile vesicles; (5) clitellum girdle-shaped, cell distribution alike on all sides; (6) bursal slit of male copulatory organ mainly transverse; (7) no subneural glands; (8) spermathecal diverticula not stalked. Further distinguishing characters are: (9) an asymmetrical arrangement of chaetae in the first lateral postclitellar bundles, with one large chaeta and one small chaeta per bundle (Fig. 1b, "lc XVI"); (10) the length ratio of spermatozoa to spermatozoal nuclei (6:1–7:1); and (11) a wavy inner surface in parts of the epithelium of the spermathecal ampulla (Fig. 1i, arrow).

Keywords: Taxonomy; New species; Ireland; Biodiversity; Soil biology

See also **Electronic Supplement** at: http://www.senckenberg.de/odes/05-05.htm

Fridericia larix sp. nov.

Etymology

From the Latin larix = larch, referring to the type locality, Larch Hill; to be treated as a noun in apposition (Fig. 1).

Type material

Holotype: Museum für Naturkunde der Humboldt-Universität Berlin, ZMB 111187; mature specimen, fixed in Bouin's fixative, stained with Paracarmin, whole-mounted in Malinol between 2 coverslips; IRELAND, Co. Dublin, Larch Hill, 53°14′N, 06°17′W, approx. 330 m a.s.l., deciduous wood, slope, soil pH 7.0–7.2 (Ca Cl_2); coll. Schmelz, Healy and Collado, July 1995. Paratypes: eight specimens, fixed, stained and mounted as holotype; ZMB 111188: 4 submature specimens, from

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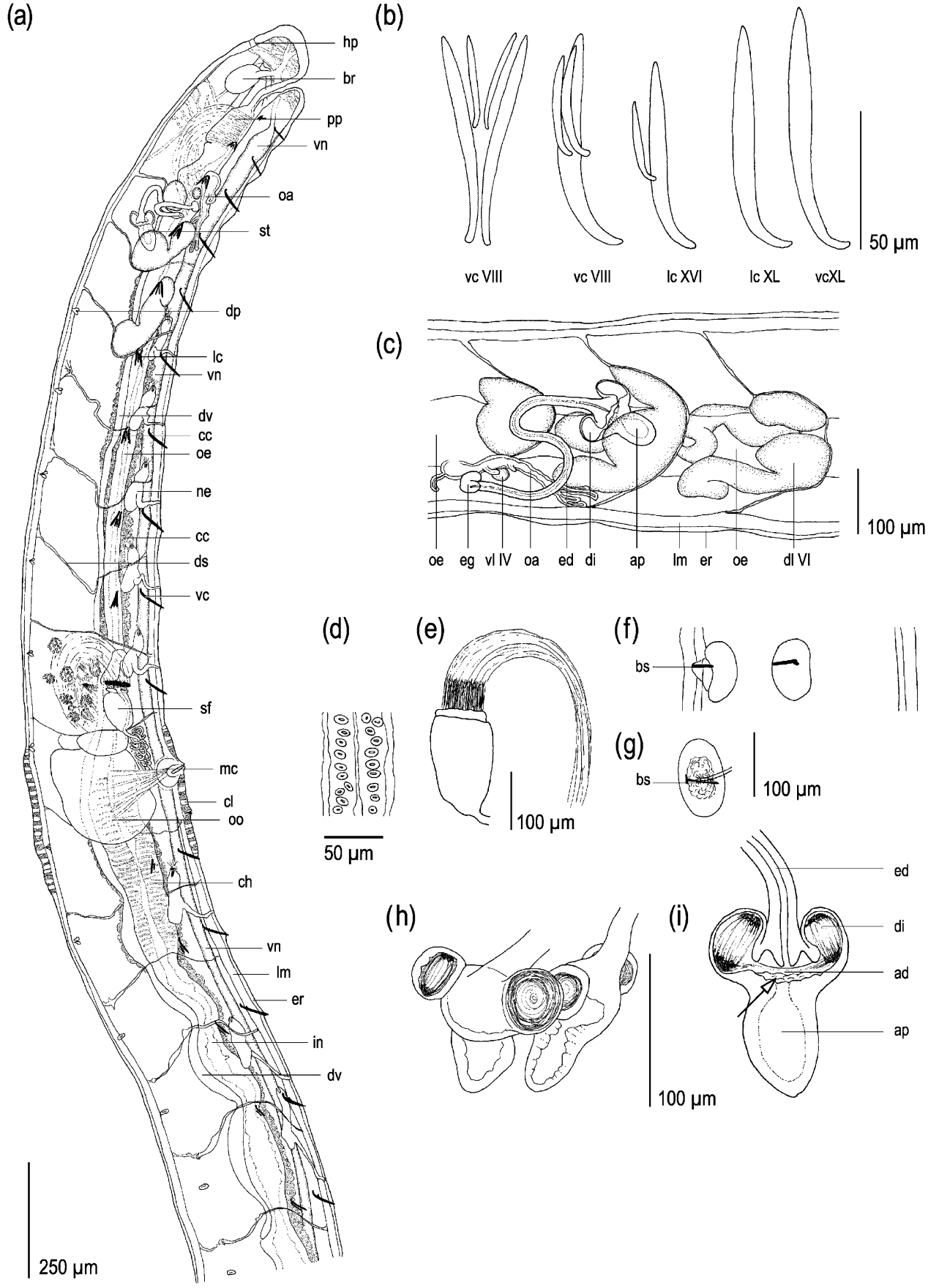
doi:10.1016/j.ode.2004.06.003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type locality, coll. Schmelz, Healy and Collado, July 1995; Zoological Museum Hamburg, ZIM OL 14280, 4 specimens from 3 localities: ZIM OL 14280a,b, 2 mature specimens, Co. Dublin, Killakee, 53°15′N, 6°19′W, approx. 220 m a.s.l., pasture lining brook, pH 5.5, coll. Schmelz, Healy and Collado, July 1995; ZIM OL 14280c, 1 mature specimen, Co. Dublin, Boranaraltry, 53°13′N, 06°15′W, 246 m a.s.l., grassland, slope, exit from nearby road to wet pasture, pH 7.6, coll. Schmelz, Healy and Collado, July 1995; ZIM OL 14280d, 1 mature specimen, ''Dave's Lawn'', Co. Galway, private property of Dave Mc Grath, grassland, 53°15′N, 9°13′W, 40 m a.s.l., at 750 m distance from the sea, coll. Schmelz, August 1996.

Diagnosis

Medium-sized *Fridericia* worms, in vivo approx. 12–15 mm long and 0.3 mm wide. Segment number of specimens with clitellum 43–48. Chaetal formula 4,3 – (3),2: 4,3 – 4,3,2; inner chaetae in bundles of four 1/2–2/3 as long as outer chaetae. Most lateral postclitellar bundles in anterior body half asymmetrical, consisting of one large and one small chaeta. Epidermal gland cells pale, in 3 conspicuous rows (preclitellar segments), cell outline irregular. Clitellum well-developed, girdle-shaped, cells in separate to dense rows; hyalocytes present on all sides, also ventrally. Body wall thick, cuticule variable (<1 μm or up to 3 μm thick). Brain broadly egg-shaped and thick. Oesophageal appendages short, with few branches. Pharyngeal glands in IV–VI; glands in IV widely connected dorsally and with minute ventral lobes, separate from dorsal lobes; glands in VI dorsally separate and with large and long ventral lobes; glands in V intermediate. Chylus cells in XII–XIV, occupying 2–3 segments. Dorsal blood vessel from XVII–XVIII. Nephridia in five preclitellar pairs, from 6/7 to 10/11, anteseptale mostly 1/2–2/3 as long as postseptale, adseptal to medial rise of efferent duct, no terminal vesicle; postclitellar nephridia with medial to subterminal rise of efferent duct. Coelomocytes numerous, mucocytes type a/c, lenticytes small. No seminal vesicle, some cysts (morulae) free in XI dorsally. Spermatozoa with short nucleus (50–60 μm in vivo, much shorter in preserved material) and long flagellum (at least 350 μm). Sperm funnel 1/3–1/2 as long as body diameter, approx. 1.5 × as long as wide, collar narrower than funnel body. Male copulatory organ rounded and compact, small to medium-sized, longer than wider than high, bursal slit mainly transverse. No subneural glands. Spermatheca: Ectal gland 1.5–2 × as wide as ectal duct diameter, rounded, not floppy, often bilobed, finely granulated. Ectal duct approx. 1.5 × as long as body diameter, proximally widened; inner (ampullar) surface of projection wavy. Ampulla subdivided into distal and proximal part; distal part with 2 sessile, oval and thin-walled diverticula oriented towards ectal duct; proximal inner epithelial surface of ampullar distal part wavy or pimpled; ampullar proximal part thick-walled, longer than wide, larger than diverticula. No ental duct. Separate attachments of spermathecae to dorso-lateral sides of oesophagus.

Remarks

The full description of *Fridericia larix* sp. nov. and comparisons with several morphologically similar

Fig. 1. *F. larix* sp. nov. (a) Anterior 17 segments, from whole mount, body interior, lateral view in preclitellar segments, shifted to dorso-lateral in postclitellar segments; male copulatory organ slightly everted; testes, ovaria and coelomocytes omitted. (b) Chaetae, whole mount, in top view (bundle of four, left) and side view (all others). (c) Segments IV–VI, from whole mount, dorso-lateral view, showing details of oesophageal appendages, pharyngeal glands and spermatheca. (d) Chylus cells, from whole mount, as seen in optical sagittal section of intestinal epithelium; intracellular canals in cross section; longitudinal arrays of cells separated by intervening intestinal blood sinus. (e) Sperm funnel, from living specimen, with dense mass of mature spermatozoa arranged in parallel on top of funnel; dark region = sperm nuclei. (f) Male copulatory organs, from whole mounts; organ to the right in ventral view, organ to the left in side view; scale as in Fig. 1g. (g) Male copulatory organ as seen in a living specimen; glandular body with hyaline outer region and a somewhat coarse inner region; modiolus small; bursal slit and rest of organ in different optical planes. (h) Spermathecae, from whole-mounts; organ to the left in oblique view, optically shortened, organ to the right in side view; note epithelial thickening between distal and proximal part of ampulla. (i) Spermatheca, from living specimen; arrow = wavy inner surface; scale as in Fig. 1h. Abbreviations. IV, VI, XL, etc. = 4th, 6th, 40th segment, respectively; ad = spermathecal ampulla, distal part; ap = spermathecal ampulla, proximal part; br = brain, supraoesophageal ganglion; bs = bursal slit of male copulatory organ, secondary male opening; cc = chloragocytes; ch = chylus cells; cl = clitellum; di = diverticulum of spermatheca; dl = dorsal lobe of pharyngeal gland; dp = segmental dorsal pore; ds = dissepimentum, septum; dv = dorsal blood vessel; ed = spermathecal ectal duct; eg = spermathecal ectal gland; er = layer of epidermis and body wall ring muscles; hp = head pore; in = intestine; lc = lateral chaetae; lm = longitudinal body wall muscles; mc = male copulatory organ; ne = nephridium; oa = oesophageal appendage; oe = oesophagus; oo = oocyte; pp = pharyngeal pad; sf = sperm funnel; st = spermatheca; vc = ventral chaetae; vl = ventral lobe of pharyngeal gland; vn = ventral nerve cord.

species are given in Organisms Diversity and Evolution Electronic Supplement 05–05, Pt 1. The Supplement also includes a list of *Fridericia* species with 2 diverticula (Electr. Suppl. 05–05, Pt 2), and an updated list of *Fridericia* species recorded from Ireland (Electr. Suppl. 05–05, Pt 3).

Reference

Schmelz, R.M., 2003. Taxonomy of *Fridericia* (Oligochaeta, Enchytraeidae). Revision of species with morphological and biochemical methods. Abh. Naturw. Ver. Hamburg, N.F. 38, 1–415, figs. 1–73.